SECTION 15.80: INDOOR AIR QUALITY
Last Updated: 11/03

Introduction

Indoor air quality has become a significant issue in recent years. Health and Safety Professionals work from a position of disadvantage in many cases due to the lack of specific regulations covering the issues, as well as the often non-specific nature of complaints received. EPA and NIOSH (National Institute for Occupational Safety and Health) are working toward regulation of indoor air quality, but it is unclear what these regulations will require or how they will fit together. OSHA will remain responsible for health and safety within the work environment. Currently, OSHA does not regulate this issue with a specific standard, but rather with the General Duty Clause mandating a "safe and healthful work environment". If specific contaminant levels above the legal PEL's (Permissible Exposure Limits) can be measured in relation to specific chemicals being used, then industrial hygiene sampling and testing can be used, followed by abatement based on results. Unfortunately, sources of discomfort may be caused by sensory perceptions from a variety of areas. For example, headache and eyestrain can occur as a result of poor ergonomics (work station design), general fatigue, low-level contaminants, and/or allergies to dust and molds. Even employee morale and interpersonal relations can become a factor.

Maintaining comfort and good relations are, nonetheless, important in any work environment. Therefore, this guideline is designed to describe the most common causes of complaints and provide self-assessment tools. The intent is to separate situations where minor adjustments in work practices or communication to building maintenance will correct the situation, from cases where air monitoring or other industrial hygiene surveys might be required. Extensive air sampling and testing is very costly, particularly where complaints are non-specific and no sources of contamination have been identified, these factors can lead to disappointment when decisive results are not obtained.

According to NIOSH, the most common primary causes of indoor air quality problems are:

Inadequate Ventilation	53%
Inside Contamination	15%
Outside Contamination	10%
Microbiological Contamination	5%
Building Materials Contamination	4%
Unknown	13%

Ventilation

According to NIOSH, 53% of the complaints investigated as a result of their Health Hazard Evaluation Program found the primary problem to be inadequate ventilation. It follows that any contaminant generated in buildings with inadequate ventilation will build up and/or migrate to other areas.

ASHRAE, The American Society of Heating, Refrigerating and Air-Conditioning Engineers provides recommended ventilation standards to maintain indoor air quality. These standards, unlike OSHA standards, do not have the force of law; rather they represent a consensus among its professional members. Local building codes may also provide guidance on ventilation issues. Qualified heating, ventilation, air-conditioning contractors should be aware of the existence and application of such standards.

Two basic approaches exist for controlling indoor air contaminants. The first is by providing ventilation air of the specific quality and quantity to the space (termed Ventilation Rate Procedure by ASHRAE). The second is achieved by controlling known contaminants (termed Indoor Air Quality Procedure by ASHRAE).

Contaminant Control

Maintaining adequate ventilation levels can control many contaminants. Where levels cannot be maintained, contaminant control is the only other option. Even with good airflow, an air system that recycles 80% of the air back into the occupant space is recycling the entrained contaminants into the occupant space as well. The extent of this recycling effect will depend upon the efficiency of the filtration system.

Cigarette smoke is one of the most common contaminants found in many indoor environments. Iowa Code 98A specifically addresses smoking prohibitions for public places. It provides for optional designated smoking areas to be established outside of state buildings.

Outside contamination control involves checking air intake vents to ensure they are functioning properly and are not pulling in contamination from outside sources such as nearby businesses or vehicle exhaust from dock areas.

Mold, Bacteria, and Other Biological Contaminants

Biological contaminants exist in all environments. Most are not harmful to humans, but excessive buildup of molds and mildew can cause discomfort and allergic reactions. Outdoor contaminants such as pollen can also add to the biological load. Individual susceptibility varies, often markedly, among any given population. Roof leaks, moisture permeation of building materials, lack of humidity control, and darkness, can create conditions where these biological contaminants can cause discomfort. Disinfection and moisture/humidity control are the best defenses against these conditions.

Building Materials Contamination

Contaminants can leach from various types of building materials to create discomfort. Paints, adhesives, insulation, particleboard, plywood, fabric, and other materials can contribute, although this may be a short-term problem, assuming all the materials listed above will eventually leach to negligible levels. Good planning is very important when remodeling activities have been approved. First, good communication with the building contractor can provide information as to what chemicals are going to be used in the process, and second, this information can be used to plan the project to provide for maximum ventilation time periods to remove contaminants. Most effective reduction of building/remodeling contaminants is to have this issue addressed in the bidding and contract stage of all projects. Good communication to occupants of buildings ahead of time will provide the information employees need to be aware of during a building and/or remodeling project. This does not imply that hazardous exposures are acceptable, but rather to provide the information of what procedures will be done to minimize exposures.

Iowa Code 89B, Hazardous Chemical Risks-Right to Know, provides for information and training for employees who handle or might be potentially exposed to hazardous chemicals. Provisions are also made for contractors to inform the employer of hazards that they are bringing into the workplace. This program can be used as a communication and planning tool to combat indoor air quality issues, by identifying potential indoor contaminants which might then be controlled by substitution, storage, handling practices, or pest control. Asking for Material Safety Data Sheets (MSDS) ahead of product use will facilitate prevention of exposures, rather than reaction to them.

Strategies

It is important to recognize the importance of early action. Measures to take first are generally the easiest.

First, upon receipt of a complaint, investigate the common sense possibilities such as air system shutdown, faulty switches, obvious chemical usage, construction activities, roof leaks, outdoor air contamination or similar condition. If chemical use is identified, suspension or modification of activities may be needed.

Second, if conditions seem to be air system related, contact building owner to let him/her know of the situation as soon as possible. Use the Self-Evaluation of Indoor Air Quality Problems form to collect the

information. This part of the process should help identify what formalized procedures might be needed relating to routine maintenance.

Third, if the condition is widespread among employees, consider providing an Indoor Air Quality Questionnaire, available from the DAS-HRE Safety Officer, to gather information.

Finally, follow-up actions may be required where additional work is needed, either from a monitoring (Industrial Hygiene) viewpoint, building maintenance, employee relations, or capital improvement perspective.

Summary

The manager responsible for the health and safety of his/her employees will need to be sensitive to this issue. The psychological factors involved along with only consensus regulations leaves the manager in a position where good judgment must be used. Use the following sequence:

1. Document complaints as they are received. Note locations, time of day, symptoms, or other relevant information.
2. Fill out Self-Evaluation of Indoor Air Quality Problems form (Appendix I), preferably with the building owner or maintenance participation. This information will be needed at some point in most cases.
3. If Self-Evaluation produces no results and complaints persist, request assistance from DAS-HRE Safety Officer. Collected information will be reviewed and visits scheduled as needed.

It is of critical importance that investigations of cases where problems persist are put in writing and sent to the proper authorities for further action. This should be interpreted to include:

- Agency director or designee.
- Properties lease holder, or County Board of Supervisors, etc.
- Department of Administrative Services – General Services Enterprise (DAS-GSE), Property Management personnel.
- DAS-HRE Safety Officer, if requested.

Note: The DAS-HRE Safety Officer may be used to facilitate any step of the process. However, lines of authority to implement recommendations or to take other actions remains with the agency and/or department. The DAS-HRE Safety Officer can make recommendations based on expertise and knowledge of various legal standards, but does not have the authority to shut down operations, evacuate buildings, or issue citations.

APPENDIX I

INDOOR AIR QUALITY QUESTIONNAIRE

1. Complaints Yes _____ No _____
(If yes, please check below)

_____ temperature too cold
_____ temperature too hot
_____ lack of air circulation (stuffy conditions)
_____ noticeable odors
_____ dust in the air
_____ disturbing noises
_____ other
(specify) _____

2. When do these problems occur?

_____ morning
_____ afternoon
_____ all day
_____ no noticeable trend
_____ daily
_____ specific days of the week
which days _____

3. Health Problems or Symptoms

Describe in three words or less each symptom or adverse health effect you experience more than two times per week.

Example: runny nose
Symptom #1 _____
Symptom #2 _____
Symptom #3 _____
Symptom #4 _____
Symptom #5 _____

Do the symptoms in Question #3 clear up within 1 hour after leaving work?
Yes ___ No ____

If no, which symptoms persist (noted at home or at work) throughout the week? Please indicate by drawing a circle around the symptom number below.
Symptom: #1 #2 #3 #4 #5

Do you have any health problems or allergies that might account for any of the above symptoms?
Yes ___ No ____

If yes, please describe _____

4. Do any of the following apply to you?
   _____ wear contact lenses
   _____ operate video terminals at least 10% of the workday
   _____ operate photocopier machine at least 10% of workday
   _____ use or operate special office machines or equipment
   (specify) _____

5. Do you smoke? Yes ___ No ____

6. Do others in your immediate work area smoke? Yes ____ No ___.

7. Your office number or work location is? _____

8. What is your job title or position? _____

9. Briefly describe your primary job tasks. _____

10. Can you offer any other comments or observations concerning your office environment? (optional) _____

11. Your name and phone number? (optional) _____